

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference P2004-0322WO	FOR FURTHER ACTION	See item 4 below
International application No. PCT/JP2004/004861	International filing date (<i>day/month/year</i>) 02 April 2004 (02.04.2004)	Priority date (<i>day/month/year</i>) 03 April 2003 (03.04.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant KAO CORPORATION		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).
2. This REPORT consists of a total of 6 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.
3. This report contains indications relating to the following items:

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input checked="" type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application
4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 740 14 35	Date of issuance of this report 02 March 2006 (02.03.2006) Authorized officer <div style="text-align: center; font-weight: bold;">Masashi Honda</div> Telephone No. +41 22 338 70 10
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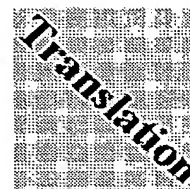
Form PCT/IB/373 (January 2004)

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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT



WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing
(day/month/year)

Applicant's or agent's file reference

P2004-0322WO

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2004/004861

International filing date (day/month/year)

02.04.2004

Priority date (day/month/year)

03.04.2003

International Patent Classification (IPC) or both national classification and IPC

Applicant

KAO CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/IP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/004861

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/004861

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 9-21, 23

because:

☒ the said international application, or the said claims Nos. 9-21, 23
relate to the following subject matter which does not require an international preliminary examination (*specify*):

The subject matters of claims 9-21, 23 relate to a method for detecting carious teeth involving fluorescent light data from the measured area, which does not require an international preliminary examination by the International Preliminary Examining Authority in accordance with PCT Article 17(2)(a)(i) and Rule 39.1(iv).

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. _____
are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. _____ are so inadequately supported
by the description that no meaningful opinion could be formed.

☐ no international search report has been established for said claims Nos. _____

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See Supplemental Box for further details.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2004/004861

Box No. V Reasoned statement under Rule 43bis.1(a)(I) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2, 4, 8, 22	YES
	Claims	1, 3, 5-7	NO
Inventive step (IS)	Claims	2, 4, 22	YES
	Claims	1, 3, 5-8	NO
Industrial applicability (IA)	Claims	1-8, 22	YES
	Claims		NO

2. Citations and explanations:

Document 1: JP, 56-40137, A (Robert. R. Alfano), 16 April, 1981 (16.04.81), & FR, 2463608, A1 & DE, 3031249, A1 & GB, 2058343, A & US, 4290433, A & CA, 1161120, A & NL, 8004712, A

Document 1 describes 1) a carious tooth detection device providing a) an ultraviolet ray irradiation device, b) a fluorescent light reception device to receive the fluorescent light from the tooth caused by the ultraviolet rays irradiated from that ultraviolet ray irradiation device, c) a fluorescent data analysis section to analyze the fluorescent data transmitted from the fluorescent light reception device, and d) a display device to display the data analyzed by that fluorescent data analysis section; and 2) that the previously mentioned fluorescent data analysis section of the carious tooth detection device analyses the previously mentioned fluorescent light data on the basis of the fluorescent light intensity of two wavelength bands of the visible light region; 3) that the previously mentioned fluorescent data analysis section calculates how far the caries is advanced on the basis of the fluorescent light intensity in the first wavelength band having a wavelength width of 10 nm or less selected from a wavelength band of 560-640 nm and the fluorescent light intensity in the second wavelength band having a wavelength width of 10 nm or less selected from a wavelength band of 440-470 nm; 4) the provision of a light device able to extract data related to the previously mentioned fluorescent light intensity from the previously mentioned first wavelength band and the previously mentioned second wavelength band from the visible light region on the fluorescent light reception device; and 5) that the previously mentioned light device is a light sensor with two color filters. As a light device as the one mentioned before, spectral luminance meters, color CCD and CMOS are well known, and ultraviolet ray irradiation devices with adjustable output intensity are also well known.

Claim 8

Document 2: JP, 2001-24223, A (Nichia Chemical Industries, Ltd.), 26 January, 2001 (26.01.01)
(Family: none)

The ultraviolet ray LED as an ultraviolet ray irradiation device is well known as described in document 2, and the idea of using an ultraviolet ray LED as the ultraviolet ray irradiation device also in the carious tooth detection device described in document 1 could have easily been conceived of by a person skilled in the art.

Claims 2, 4, 22

A carious tooth detection device performing the analysis on the basis of the fluorescent light intensity, which changes corresponding to changes in the irradiation intensity of ultraviolet rays, and a carious tooth detection device performing the analysis on the basis of the fluorescent light intensity

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/004861

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

in three or more wavelength bands from the visible light region are not described in any of the documents cited in the ISR, and these points are also not obvious even for persons skilled in the art.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 4-32899A	FOR FURTHER ACTION		See item 4 below
International application No. PCT/EP2004/003588	International filing date (<i>day/month/year</i>) 05 April 2004 (05.04.2004)	Priority date (<i>day/month/year</i>) 14 April 2003 (14.04.2003)	
International Patent Classification (IPC) or national classification and IPC 7 C12Q 1/68			
Applicant NOVARTIS AG			

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).
2. This REPORT consists of a total of 8 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input checked="" type="checkbox"/> Box No. II	Priority
<input checked="" type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Date of issuance of this report 14 October 2005 (14.10.2005)
Facsimile No. +41 22 740 14 35	Authorized officer <div style="text-align: center; font-weight: bold;">Yolaine Cussac</div>
Telephone No. +41 22 338 70 80	

PATENT COOPERATION TREATY

REC'D 04 AUG 2004

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From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2004/003588

International filing date (day/month/year)
05.04.2004

Priority date (day/month/year)
14.04.2003

International Patent Classification (IPC) or both national classification and IPC
C12Q1/68

Applicant
NOVARTIS AG

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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D-80298 Munich
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Authorized Officer

Sommerfeld, T

Telephone No. +49 89 2399-7197



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/003588

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/003588

Box No. II Priority

1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/003588

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 7, 9, 11

because:

☒ the said international application, or the said claims Nos. 7, 9, 11 relate to the following subject matter which does not require an international preliminary examination (*specify*):

see separate sheet

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the whole application or for said claims Nos.

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See separate sheet for further details

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/003588

Box No. V Reasoned statement under Rule 43b/s.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	5-45
	No: Claims	1-4
Inventive step (IS)	Yes: Claims	5
	No: Claims	1-4, 6-45
Industrial applicability (IA)	Yes: Claims	1-6, 8, 10, 12-45
	No: Claims	

2. Citations and explanations

see separate sheet

In this written opinion reference is made to the following documents:

- D1: KITCHING RICHARD ET AL: 'Coordinate gene expression patterns during osteoblast maturation and retinoic acid treatment of MC3T3-E1 cells.' JOURNAL OF BONE AND MINERAL METABOLISM. JAPAN 2002, vol. 20, no. 5, 2002, pages 269-280, XP002286916 ISSN: 0914-8779
- D6: SETH ARUN ET AL: 'Coordinate expression of novel genes during osteoblast differentiation' JOURNAL OF BONE AND MINERAL RESEARCH, vol. 15, no. 9, September 2000 (2000-09), pages 1683-1696, XP009033034 ISSN: 0884-0431
- D9: MCGALL G ET AL: 'LIGHT-DIRECTED SYNTHESIS OF HIGH-DENSITY OLIGONUCLEOTIDE ARRAYS USING SEMICONDUCTOR PHOTORESISTS' PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US, vol. 93, 1 November 1996 (1996-11-01), pages 13555-13560, XP000775688 ISSN: 0027-8424 cited in the application

The present application discloses gene profiling assays of the osteoblast-like cell lines MC3T3-E1 and MC3T3-1b to be used for screening drugs which modulate osteoblast differentiation.

Section III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

Claims 7, 9 and 11 relate to subject-matter considered by this Authority to be covered by the provisions of Rule 67.1(iv) PCT. Consequently, no opinion will be formulated with respect to the industrial applicability of the subject-matter of these claims (Article 33(4)(a)(i) PCT).

Section V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Document D1 discloses gene profiling of MC3T3-E1 cells in several phases of differentiation and in response to retinoic acid treatment (see e.g. abstract), and provides a comparative osteoblast gene expression study (page 271 right column last paragraph, tables 1-3).
It thus appears that document D1 discloses a method which comprises all the features of claim 1. Claim 1 thus lacks novelty (Art. 33(2)PCT). The same applies to claims 2-4.
2. Claim 5, which is directed to the screening method of claim 1, wherein in the gene analysed is Hey1, appears to be both novel and inventive, as this gene had not been associated with osteoblastic differentiation (Art. 33(2)(3)PCT).
3. Claims 6-20 are directed to methods of diagnostic, treatment and screening of drugs which do not appear to involve an inventive step (Art. 33(3)PCT) in view of D1 in combination with D6, which discussed the relation between manipulation of genes involved in osteoblastic differentiation and osteoporosis (page 1693 right column last 3 lines).
4. Claims 21-34 refer to features which are standard in the method of DNA microarrays analysis (see e.g. document D9). These claims thus lack an inventive step (Art. 33(3)PCT).
The same applies to claims 35-45 which are directed to the computer implementation of the above methods.

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- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
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